

of from 1% to 90% of the weight of the pultruded conductive composite member. The plurality of carbon fibers may be metal coated and pultruded in a resin binder to form a cross-sectional shape that comprises a metal coating wherein the coating has a weight in the range of from 1% to 90% of the weight
5 of the pultruded conductive composite member. The plurality of carbon fibers may be metal coated and separated from another by at least one of a resin binder and insulating fiber. A plurality of conductive fibers may be bundled together forming at least one set of conductive fibers, the at least one set of conductive fibers having a length and cross sectional area in the range of from
10 less than 0.01 square microns to 1000 square microns wherein a metal coating having a thickness is disposed on at least a portion of an outside surface of the at least one set of conductive fibers. Fibrillated fibers may extend from a surface. The fibrillated region may have a length in the range from 0.001 mm to 100 mm and be substantially flexible. The fibrillated region
15 may include an exposed plurality of conductive fibers extending from the member. The apparatus may be suitable for use in an RF electric circuit to conduct current in the range of 1 hertz to 100 giga-hertz.

It is appreciated that various other alternatives, modifications, variations, improvements, equivalents or substantial equivalents of the
20 teachings herein that for example, are or may be presently unforeseen, unappreciated or subsequently arrived at by applicants or others are also intended to be encompassed by the claims and amendments thereto.

What is Claimed:

1. An apparatus comprising:

a substrate member including a length, a width, a thickness, and a surface area, the substrate member including a polymer, a plurality of conductive members and a plurality of non-conductive members, each of the conductive members and the non-conductive members have a length and an imaginary axis; wherein the plurality of conductive members comprises a plurality of conductive fibers and a polymer material, the plurality of conductive fibers configured in a relation to each other and in association with the polymer material; wherein the plurality of conductive members and the plurality of non-conductive members are disposed in the substrate member and are selectively situated with respect to each other and form a matrix configuration including at least one selected dimension between the imaginary axis of the plurality of conductive members and including at least one selected dimension between the imaginary axis of the plurality of non-conductive members; wherein the polymer of the substrate member is solidified about at least a portion of a periphery of the plurality of conductive members and is solidified about at least a portion of a periphery of the plurality of non-conductive members forming an integral structure; and wherein at least one conductive member includes an exposed surface for contact.

2. The apparatus of **claim 1**, wherein at least one of the conductive members and the non-conductive members are pultruded composite members.

3. The apparatus of **claim 1**, wherein at least one conductive member extends from the substrate at a first side and from the substrate at a second side for a selected distance.

4. The apparatus of **claim 1**, wherein the exposed surface includes fibers unbound and substantially free of polymer.

5. The apparatus of **claim 1** wherein the plurality of conductive members and the plurality of non-conductive members are disposed in more than one plane.

6. The apparatus of **claim 1** wherein the apparatus is adapted for association with at least one element and an electrical circuit.

7. The apparatus of **claim 1** wherein the apparatus is adapted for association with at least one element and a temporary electrical circuit wherein the at least one element is removeably securable to the apparatus.

8. The apparatus of **claim 1** further comprising an integrated circuit wherein the integrated circuit is securable to at least a portion of the apparatus.

9. The apparatus of **claim 1** further comprising a die wafer containing individual integrated circuit chips wherein the die wafer is securable to at least a portion of the apparatus.

10. The apparatus of **claim 1**, wherein at least one conductive member includes a first surface area and a second surface area exposed for conduction of energy therethrough wherein the energy is selected from at least one of electric, thermal, sound, sonic, and light energy.

11. The apparatus of **claim 1**, wherein the imaginary axis of at least one of the conductive members and the non-conductive members includes a form selected from substantially straight, angled, and curved.

12. The apparatus of **claim 1**, wherein at least one conductive member includes a plurality of conductive carbon fibers.

13. The apparatus of **claim 1**, wherein at least one conductive member is accessible along at least a portion of its length to provide a conductive surface area for contact.

14. The apparatus of **claim 1** wherein an area of the conductive member as a percent of an area of the substrate member ranges from 0.01 % to 99.5 %.

15. The apparatus of **claim 1** further comprising at least one additional substrate member, the at least one additional substrate member including: (a) a plurality of conductive members comprising a plurality of conductive fibers, the conductive members having a length; and (b) a plurality of non-conductive members comprising at least one of a non-conductive fiber and a non-conductive resin, the non-conductive members having a length, the conductive members and the non-conductive members forming a matrix configuration; wherein the at least one additional substrate member is adapted for functional association with the other substrate member and defining an array of substrate members including a configuration dependent on the selected number of substrate members.

16. The apparatus of **claim 1** wherein the substrate member comprises a polymer selected from at least one of structural thermoplastic, thermosetting resin, and crosslinked silicone elastomer.

17. The apparatus of **claim 1** wherein the fibers include carbon including at least one of carbonized polyacrylonitrile fibers, carbonized pitch fibers, carbonized polybenzimidazoles (PBI) fibers, metalized carbon fibers, and combinations thereof.

18. The apparatus of **claim 1** wherein the fibers include at least one of metal, metal alloy, glass, metalized glass, metalized ceramic, metalized polymer, optically transmissive polymer, and combinations thereof.

19. The apparatus of **claim 15** wherein the array of substrate members is assembled into a configuration by heat lamination, adhesive bonding, ultrasonic or other welding process, by mechanical fastening or interlocking, or combinations thereof.

20. An apparatus comprising:

a substrate member comprising a polymer, the substrate member including: a length; a width; and a thickness;

a plurality of conductive pultruded composite members including a plurality of conductive carbon fibers and a polymer material, the plurality of conductive carbon fibers configured in a relation to each other and in association with the polymer material, each conductive pultruded composite member having a first end and a second end; and

a plurality of non-conductive members including a plurality of non-conductive fibers, each non-conductive member having a first end and a second end;

wherein the plurality of conductive pultruded composite members and the plurality of non-conductive members are disposed in the substrate member and are selectively situated with respect to each other and form a matrix configuration including at least one selected dimension between the imaginary axis of a plurality of conductive pultruded composite members and including at least one selected dimension between the imaginary axis of a plurality of non-conductive members; wherein the polymer of the substrate member is solidified about at least a portion of a periphery of the plurality of conductive pultruded composite members and is solidified about at least a portion of a periphery of the plurality of non-conductive members forming an integral structure; and wherein at least one conductive pultruded composite member is accessible at the first end and the second end for contact.

21. The apparatus of **claim 20**, wherein at least one of the conductive pultruded composite members includes a flexible fibrillated region.

22. The apparatus of **claim 20** wherein at least one of the conductive pultruded composite members includes a hard, non-fibrillated region.

23. The apparatus of **claim 20** wherein at least one of the conductive pultruded composite members includes a shaped profile, the shaped profile selected from at least one of rectangular, square, stepped, concave dome, convex dome, concave point, convex recess, angular, and irregular.

24. The apparatus of **claim 20** wherein the substrate member includes a recessed area.

25. The apparatus of **claim 20** wherein the substrate member includes a plurality of conductive pultruded composite members extending in a plurality of longitudinal directions in more than one plane.

26. An apparatus comprising:

- a substrate member comprising a polymer, the substrate member having a length, width, and thickness;
- a plurality of conductive members having a first end, second end, and length, the plurality of conductive members comprising a plurality of conductive fibers extending in the substrate member;
- at least one continuity break defining an interruption along the length of at least one conductive member between the first end and the second end of the at least one conductive member;
- at least one conductive contact area is associated with at least one conductive member on one side of the at least one continuity break, and at least one conductive contact area is associated with at least one conductive member on the other side of the at least one continuity break;
- wherein the plurality of conductive members are disposed in the substrate member and are selectively situated with respect to each other and form a matrix configuration including at least one selected dimension between the imaginary axis of a plurality of conductive members; wherein the polymer of the substrate member is solidified about at least a portion of a periphery of the plurality of conductive members forming an integral structure.

27. The apparatus of **claim 26**, wherein the at least one continuity break is defined by a recess formed in the substrate member and removal of a portion of the at least one conductive member.

28. The apparatus of **claim 26**, wherein the at least one recess includes a width, depth, and extends in the substrate member.

29. The apparatus of **claim 26**, wherein the apparatus further includes a plurality of non-conductive members comprising non-conductive fibers.

30. The apparatus of **claim 29**, wherein at least one of the conductive members and the non-conductive members are pultruded composite members.

31. The apparatus of **claim 26**, wherein the at least one conductive contact area is adapted to associate with at least one of an integrated circuit and an electronic component to provide continuity from the at least one conductive member on one side of the at least one continuity break, across the at least one continuity break, and to the at least one conductive member on the other side of the at least one continuity break.

32. The apparatus of **claim 26**, wherein an end of at least one conductive member extends from the substrate.

33. The apparatus of **claim 26**, wherein the plurality of conductive members includes exposed fibrillated fibers.

34. The apparatus of **claim 26**, wherein the plurality of conductive composite members include conductive fibers comprising at least one of carbon fibers, metallized carbon fibers, metallized glass fibers, metallized polymeric fibers, carbon particle containing polymeric fibers, metal particle containing polymeric fibers, intrinsically conducting polymeric fibers, fine metal wires, and combinations thereof.

35. The apparatus of **claim 26**, wherein the substrate member comprises at least one conductive member including a first surface area on one side of the at least one continuity break and a second surface area on the other side of the of the at least one continuity break exposed for conduction of energy therethrough wherein the energy is selected from at least one of electric, thermal, sound, sonic, and light energy.

36. The apparatus of **claim 26**, wherein the at least one conductive contact area is adapted to associate mechanically and electrically with an electronic component to provide an electro-mechanical contact.

37. The apparatus of **claim 26**, wherein the at least one non-conductive area is adapted to associate mechanically with an electronic component to provide a mechanical contact structure.